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EXTENSION WORK IN AGRICULTURAL ENGINEERING, 1922.[1]

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CONTENTS.

The chief extension activities in rural engineering carried on in 1922 were prevention of soil erosion, the drainage of swamp and wet lands, irrigation of arid or semiarid lands, construction of better and more economical farm buildings, selection and care of farm machinery, construction of better and more convenient farm homes, and clearing of lands.

PREVENTION OF SOIL EROSION.

Without doubt the most important of the engineering projects in 1922, considering the time devoted to it, interest manifested and results obtained, was the prevention of soil erosion. The use of the Mangum terrace (fig. 1), followed by the growing of such crops as will add humus to the soil, has been generally adopted as the best method of preventing sheet washing, while the soil-saving dam is used extensively for controlling gullying. These methods have proved successful and have received wide recognition (fig. 2).

The need for terraces under such widely different conditions as are present in Indiana, a comparatively old agricultural State, and in Oklahoma, whose lands have only recently been brought into cultivation, is indicated by the State extension agents' reports (fig. 3). The report from Indiana states:

> A large per cent of the soil in the southern one-third of the State, or in about 30 counties, is subject to washing; in fact, hundreds of fields, and in numerous instances, entire farms have been abandoned because they have been literally washed away.

[1] Prepared by the Extension Service, Office of Cooperative Extension Work, and the Bureau of Public Roads, Division of Agricultural Engineering, cooperating.

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The report from Oklahoma states:

Half of the farm land in this State will have to be terraced, or the next generation will have but little soil on which to produce a livelihood. In fact, there are a great many fields now that might just as well lie idle, for the farmer can not produce enough to pay for the seed and labor.

The building of a terrace requires the use of a simple leveling instrument and a small amount of engineering skill, so that the farmer, although he may be convinced of its practicability and profitableness, unfortunately does not seem inclined to do any terracing, until he can get the county agent, or the extension rural engineer, to lay out his work for him. Oklahoma reports that "Calls are so numerous that it is impossible for the county agent to help everyone who calls, even if he should devote all his time to terracing work."

FIG. 1.—Constructing the Mangum terrace with homemade equipment, showing the homemade drag in operation. Each round of the walking plow is followed by the drag. The dirt is moved toward the center of the terrace, building the center up to 15 to 20 inches higher than the ditch on the upper side.

The present methods of instruction generally include meetings and lectures, distribution of bulletins and other information, and actual demonstrations. Of these methods the demonstrations are by far the most effective. The methods of demonstration used in Ohio are indicated in the following report:

The extension rural engineer allotted two days for each demonstration, but advertised only the second day. This enabled the layout for the major part of the work to be carried on without interference during the forenoon of the first day. In the afternoon, the construction work was pushed as far as possible. During the forenoon of the second day, the construction work was continued. Interested parties watched the work from the start, but little time was given to answering questions.

The meetings were scheduled for 2 o'clock the second afternoon. As soon as the crowd gathered, the county agent introduced the extension rural engineer and turned the meeting over to him. A short talk on the cause of erosion and methods of control was followed by: (1) Explanation of each

step; (2) examination of the entire field to determine the best outlet for flow from the terraces, taking levels where necessary; (3) discussion of the reasons for the selection of the outlet; (4) repetition of layout of the first terrace (one at top of hill which has already been constructed) to prove that it is correctly graded; (5) layout of new lines of terrace at lower side of the field; (6) setting the necessary stakes; (7) plowing of scratch furrow to mark upper and lower limits of terrace; and (8) construction of the new terrace which has just been outlined. The county agent acted as

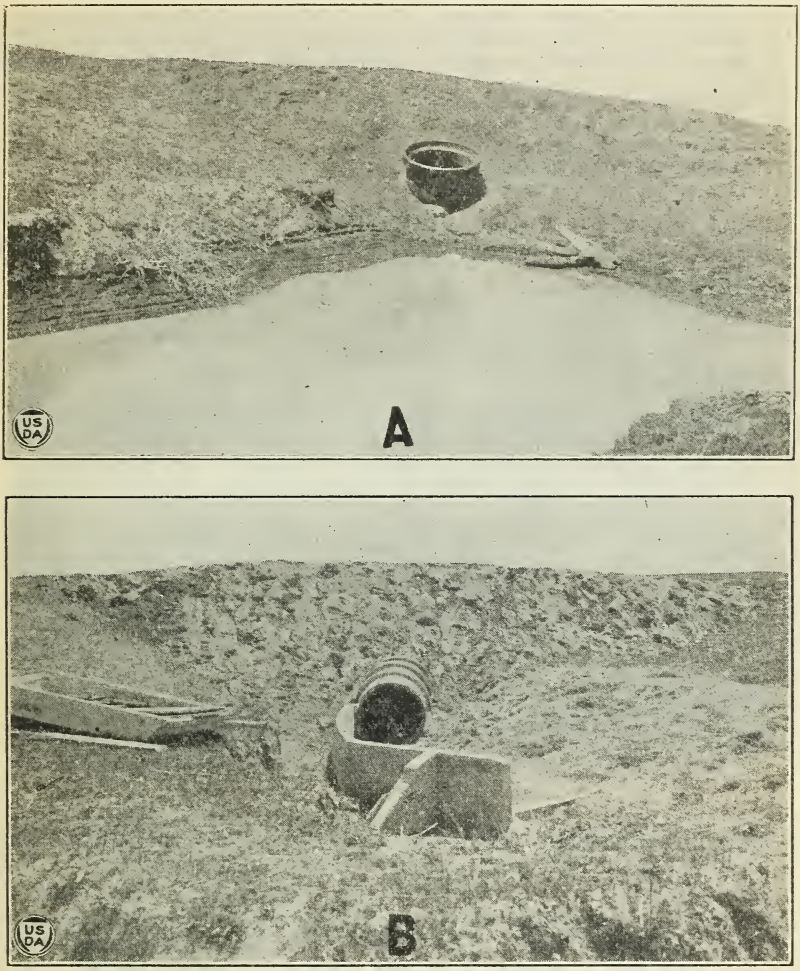

FIG. 2.—The upper side (A) of a soil-saving dam, showing the inlet pipe, and the lower side (B) showing the outlet.

foreman of the construction crew, leaving the extension rural engineer free to answer questions during the period of construction. Twenty-two acres of land was terraced in two demonstrations.

The site of the demonstration should be adjacent to and visible from a well-traveled highway. After the work is completed, a sign should be erected on the roadside showing the cost of the work and other helpful information.

In many States, emphasis is placed on the growing of crops furnishing humus. Humus aids greatly in preventing washing after the terrace is built. The county agent is required to keep in touch with the work to see that the proper crops are grown and that the terraces are properly maintained. The following methods of cropping, with variations to suit local conditions, are recommended in Texas:

(1) Deep fall and winter plowing.
(2) Plowing under stalks and other vegetation.
(3) Wide rows of corn, or grain sorghums, with velvet beans or cowpeas between .
(4) The planting of legumes.
(5) Rotation with sowed crops.
(6) Winter cover crops.
(7) Contour plowing or listing.
(8) The scattering of straw or manure.

A very successful exhibit of terracing was made at a fair in Oklahoma. A plot of ground, 27 by 40 feet, was arranged to show

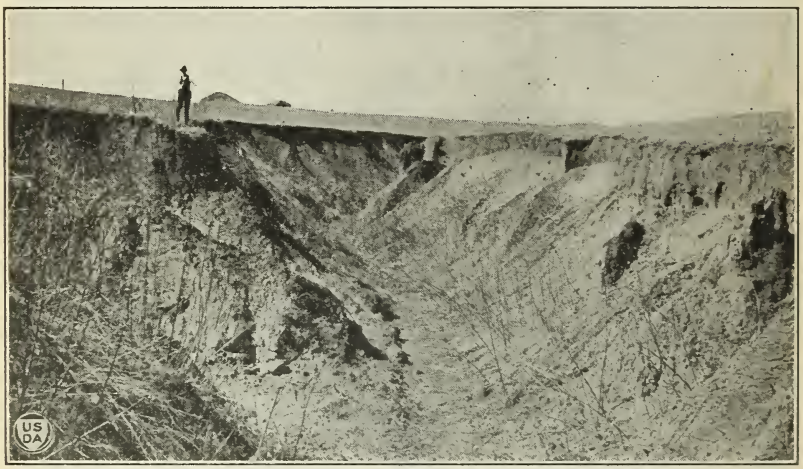

FIG. 3.—Type of gully which can be reclaimed by a soil-saving dam.

in miniature many of the problems encountered in terracing and the methods of solving them. A lawn sprinkler was used to furnish the "rain." The rain and the water running over the hillsides and down the riprapped ditches presented a very definite picture of the workings of a system of terraces as well as some of the resulting benefits. The gullies in the field were exaggerated but were completely filled during the week's demonstration.

On account of the many calls received for assistance, the greatest problem in terracing is to instruct some men in each community how to do the simple engineering work required in laying out a terrace (fig. 4). With this end in view, Alabama gives a special course to one or more persons previous to each demonstration to fit them for terrace leaders. Such leaders are furnished with proper equipment and are allowed to charge the farmers for their services in laying out terraces, such charges to be within limits designated by the local group of farmers. In Oklahoma, rural

engineering clubs are being organized among the boys. The boys in these clubs take a year's course in terracing and are able to lay out terraces when they finish the course.

Fourteen Southern States report that through the efforts of the extension service 544,641 acres of land on 28,937 farms were terraced during the past year.

DRAINAGE.

As a whole, the drainage project has not made the progress during 1922 which was hoped for and expected. This seems to be due partly to the high cost of drain tile, of which many States complain, and partly to the hard times to which the farmers generally have been subjected.

For small drainage systems, the general opinion seems to be that the best results are obtained by demonstrations on selected farms

FIG. 4.—Laying out a terrace.

in each locality (fig. 5), although the adjoining farmers are sometimes very slow in putting in similar systems on their own farms. In New York, where the first underdrains were laid many years ago, and where they have been demonstrating the value of drainage ever since, the individual demonstration is still thought to be the best method of giving instruction in drainage. The method used in that State is outlined in the following report:

> The method of procedure is to cooperate with the county agents all over the State in assisting interested parties to actually solve their drainage problems. This is done by sending a thoroughly competent drainage engineer to the farm where he demonstrates to the small group gathered the actual steps involved. If the undertaking is practical and the farmer is ready and able to put in the system, the drainage lines of tile or open ditch are computed and staked out. This stage of the undertaking is interesting, but it does not convince the farmer and his neighbors of the real benefits which will result. It is when the drains are completed and the results evident that the actual demonstration has been accomplished.

The laying out of a drainage system, even a small one, requires more extensive engineering knowledge and skill than can possibly be taught in a few days or weeks to a large number of individuals, so that it is impossible to develop drainage leaders in each community. However, there are now many calls for assistance, and there will be more in the future, so the time will soon come when the extension service will be unable to give detailed assistance to all who ask for it. To meet this condition, as well as some others, the extension service in Oregon has adopted the following plan in regard to giving individual service:

The extension rural engineer plans a drainage system for the entire farm and leaves the setting of the grade stakes to a local surveyor. This plan avoids competition with the local surveyor and provides a plan which the farmer can work out later without having to dig up and replace tile drains

FIG. 5.—A demonstration may be given permanent value by the use of roadside signs.

as drainage development takes place. This gives a service which can not be obtained locally as the local surveyor is seldom familiar enough with soil conditions to lay out good farm drainage systems.

This individual service is supplemented by giving aid in the organization of drainage districts, by exhibits of models, by publications, and by holding local schools (fig. 6).

The following example of the benefits derived from drainage improvements fostered by the extension service is taken from the Viginia report:

This project covered 12 acres of land which had a stiff clay subsoil and a clay loam top soil. The tile in this system was spaced 30 feet apart and 2½ feet deep. This spacing is 30 feet closer than is generally the practice and consequently doubled the cost of the average spacing of 60 feet. The system cost approximately $1,200, or $100 per acre. On 6 of the 12 acres tiled, the owner has been raising raspberries for a number of years. Last year (1921), which was a wet year, he raised 7,093 pints of raspberries on this 6 acres. This was about the average crop for wet years. This year the crop season was the wettest experienced in years and most of the farmers had heavy losses from excessive moisture. In spite of this, the 6 tiled acres produced 18,302 pints of raspberries, or 158 per cent more than the year before he drained the

land. He received $2,850 for the crop. Had the land not been drained, he would certainly not have raised more than 7,090 pints and in all probability much less. The 7,090 pints would have brought in $1,099.41. In other words, the owner received from the 6 acres, $1,750.59 above the preceding year, or $1,150.59 above the cost of draining the 6 acres, or $5,550.59 above the cost of the entire drainage system for the 12 acres.

FIG. 6.—Before and after drainage. Eight acres were reclaimed and the road entirely drained at a cost of $395.

A summary of the county agents' reports shows that 574,693 acres were drained during the year. but as a part of this acreage was drained by means of open ditches, these figures do not indicate the area of completely drained land.

IRRIGATION.

Little work in irrigation is done by extension forces except in Utah, although some assistance has been given farmers along this

line in Kansas, Oklahoma, Oregon, Texas, and Washington. An extension rural engineer was employed by California shortly before the end of the year. The work as carried on in Utah may be summarized as follows:

The problem is the more efficient use of water supply available to irrigation without the use of extensive and expensive storage works. A good deal of work has been done in getting separate but adjoining canal systems serving the same or adjacent lands to combine into one system under one control, which results in more economical utilization of the water available and in the reduction of overhead expenses. Studies are being made concerning the control of gravel flow in three different stream systems. Plans have been worked out which contemplate preventing any gravel or sand from entering the canals after these plans are put into effect. The water users under one of these systems by their own efforts have completed the control works as designed, and work is in progress on the others. In addition, one of these companies has built a concrete and steel weir and divider for regulating the flow of the water after the gravel menace has been removed. It is estimated that the systems of operation now being installed will reduce maintenance costs to only 10 per

FIG. 7.—The use of early run-off is recommended for irrigation in Utah.

cent of what it had formerly been. Demonstrations in the use of early water showed a remarkable increase in yield as a result of early irrigation as compared with the ordinary methods (fig. 7). The rainfall is light in this region and invariably the soil is dry in the spring, just a few inches below the surface. The water penetrates much better just as the frost is going out than at any other time, so that by using the early water a supply of ground water is built up against the needs of the growing season.

The reports of county agents in 34 Northern and Western States show that 584 irrigation systems were planned with a total acreage of 163,058.

FARM BUILDINGS.

This work has been carried on extensively by a large number of States, usually by the distribution of standard plans for buildings, by giving individual assistance in planning structures in special cases, and by demonstrations and meetings held during the construction of the buildings. A number of States have had their standard plans photographed, reduced in size to 8 by 10 inches and bound

in books which are distributed to the county agents. From these books farmers may select the plans which are best suited to their needs. During the past year most plans sent out have been for poultry and hog houses. This has caused one extension agent to remark that the farmers at this time are more interested in buildings which will give a quick return on the money invested than they are in other types of buildings. The following extract from North Carolina is typical of the work which is being done on this project:

Visits were made to various sections of the State where a number of people were interested in any of these projects. The locations were gone over and best plans suggested. Along with this, bills of materials and estimates of cost were given. In many cases after everything was ready a practical working demonstration was put on. At these demonstrations all the interested parties are invited and are usually present. Besides being able to show and impress them with what we are trying to put across, these demonstrations have proved a very valuable asset in getting other work started. The demonstrations were placed in as centrally located places as possible. A number of self-feeders were placed on courthouse squares so that interested parties might see them.

Six hundred and nine blue prints and bills of material for various farm buildings were sent out. Bills of material for 13 different sizes of stave silos and 19 different sizes of concrete silos were compiled. From a survey made of 200 farms, it was found that the damage done by rats and weevils in stored corn averaged 5 per cent, although in some cases estimates were as high as 25 per cent.

The reports of the county agents show that 17,562 farm buildings, other than dwellings, were constructed with the aid of the extension service during the year.

FARM-HOME PROJECTS.

The subjects of water-supply systems, sewage disposal, lighting plants, and plans for dwellings come under this head. The work is carried on by means of meetings, by personal service, and by printed matter.

During the summer of 1921, and again in 1922, a water-supply truck was operated with great success in New York State, as shown by the following report:

The purpose of this series of demonstrations was to show by practical demonstration, in which standard fittings were used, the simplicity and relatively small cost of installing cold and hot running water, a water closet, and an adequate sewage-disposal system.

The equipment used consisted of a collapsible framework which permitted the construction of a floor 3 feet by 12 feet and of a wall of the same length and 7 feet in height, part of the floor and one wall of a kitchen (fig. 8). This much of the equipment was set up and other equipment was conveniently placed before the demonstration. The demonstration consisted of setting up in this part of the room made by the wall and floor a sink with drain and a pitcher pump with which water was drawn from a cistern. After discussion, this pump was replaced with a force pump, and an overhead storage tank was installed. A faucet was placed at the kitchen sink and pump, tank, and faucet so connected by piping that water could be pumped into the tank or into the sink or allowed to flow from the tank to the water system for the kitchen. Where conditions permitted, a closet was partitioned off and a toilet with complete drainage was set up. This led to the question of sewage disposal which was answered by a discussion of the septic tank and absorption system illustrated, as far as seemed practicable, with a box and a short piece of pipe. Each demonstration, including time for questions, required two and one-half to three hours. A truck was used for this purpose because it was possible to carry this apparatus by trucks and demonstrate the work to communities which were not on the railroad.

Considerable work has been done in advocating the use of small water-power plants on the farm, especially the use of hydraulic rams. The ram makes use of power that is now going to waste and is very faithful, working 24 hours each day and 365 days each year. It pumps the water high enough so that the farm home where it is installed is just as convenient from the standpoint of water as is the city home. It also furnishes fresh water for stock at all times and just where needed. The following extract from a report from Virginia is typical of this project.

After a survey of the premises it was found that the housewife was walking 140 miles per year and expending enough energy in lifting water to do the work of two horses in plowing 11 acres of land. A small hydraulic ram, overhead storage, kitchen sink, and waste pipe were purchased for $49, which put running water into the kitchen (fig. 9).

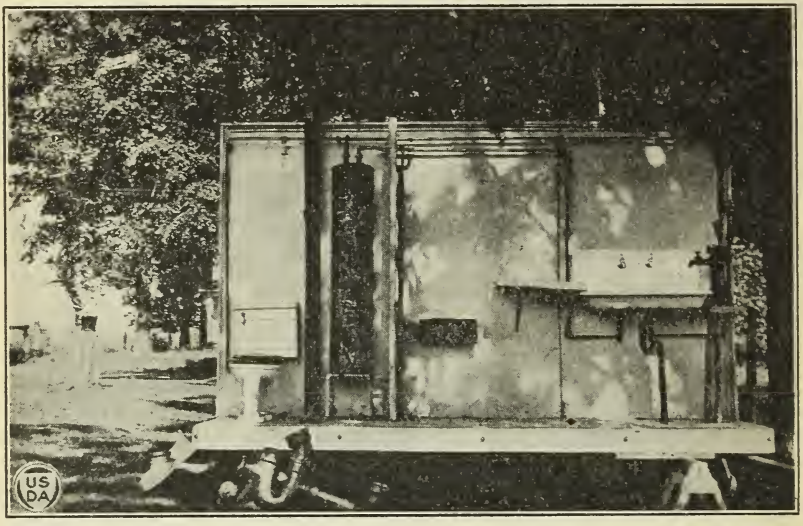

FIG. 8.—A water-supply demonstration equipment as it appears during the demonstration.

A summary of the county agents' reports shows that 2,447 farm-home water systems, 2,107 sewage-disposal plants, and 5,883 lighting systems were installed during the past year. In addition to this, 3,618 farm dwellings were built or remodeled from plans furnished by the extension service during the year.

FARM MACHINERY.

Extension work in farm machinery consisted in giving instruction in the selection, operation, care, and repair of all types of farm machinery. Due to the large and increasing use of gas-engine machinery on the farm much time and effort has been devoted to this subject. It is generally agreed that in the use of a good engine, its success or failure, the work done, the repairs necessary, and the life of the engine, are proportional to the care given it and to the training of the operator. Instruction can best be given in schools, which is the method generally followed. The equipment required for one

of these schools is quite extensive and is generally taken from place to place in trucks. The schools are held in the winter or in other seasons when farm work is not pressing. The method of teaching used in New York is indicated in the following report:

Three types of schools were held: (1) The gas-engine school, with the aim of increasing the effective use of gas engines on the farms; (2) the shop school, with the aim of decreasing the cost of repairing and overhauling farm equipment; and (3) the combined gas-engine and shop school, with the aims of both the gas-engine and shop schools combined in one school. The following statement shows the type and number of schools held in 1922:

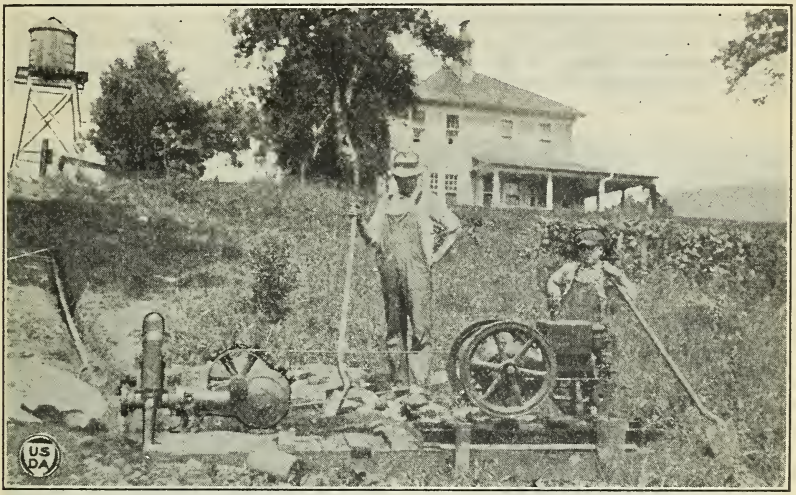

FIG. 9.—A complete water-supply installation.

Type of school:	Number.
5-day gas-engine and farm-shop	10
3-day gas-engine	2
4-day gas-engine	14
5-day gas-engine	1
3-day farm-shop	2
Total	29
Average attendance per school	26.3
Total enrollment	763
Greatest enrollment	67
Smallest enrollment	11

The gas-engine school is devoted primarily to the single-cycle gas engine. To it the college brings a very complete set of demonstration equipment (magnetos, carburetors, cut-out coils, and similar equipment), supplies, and tools (fig. 10). The first two days are devoted to demonstrations on an engine secured in the community and to a discussion of the general principles involved in this and similar engines. Special emphasis is placed on ignition systems, magnetos, testing for ignition trouble, and valve timing. The third day is devoted to overhauling and adjusting engines by the student under the supervision of the instructors. The last day is devoted to practice in locating engine troubles, clearing up doubtful points raised by the students, and in teaching some shopwork, especially rope splicing and soldering.

The shop school lasts three days and is made up of demonstrations by the instructors and practice by the students. The college carries a very complete line of supplies and equipment, so that during the practice periods five men may be filing saws, five men soldering, others mending harness, splicing rope, using the pipe tools or the metal tools, lacing belts, and doing similar occupations.

The following notes about tractor schools are taken from the California report:

The most desirable period of time for a tractor school is five days, starting Monday morning and ending Friday night. The student's time must be planned so that he is busy every minute of the day, progressing from the minor to more difficult jobs. Reserve work should always be available. It is very necessary to have sufficient hand tools for the practice work. The success of the school depends upon complete organization.

It is very essential that the instructors give effective and practical demonstrations in repairing and allow the students to repeat the practice either on their own tractor at the school or on equipment prepared for them. It is not desirable to undertake general overhauling or repairing instruction unless sufficient tractors are available that require this work.

A rural location for the tractor school is desirable, such as a warehouse, farm shop, or machine shed. It is much easier to have the tractors assembled at a rural center than in town. Better interest was shown at schools held in rural communities.

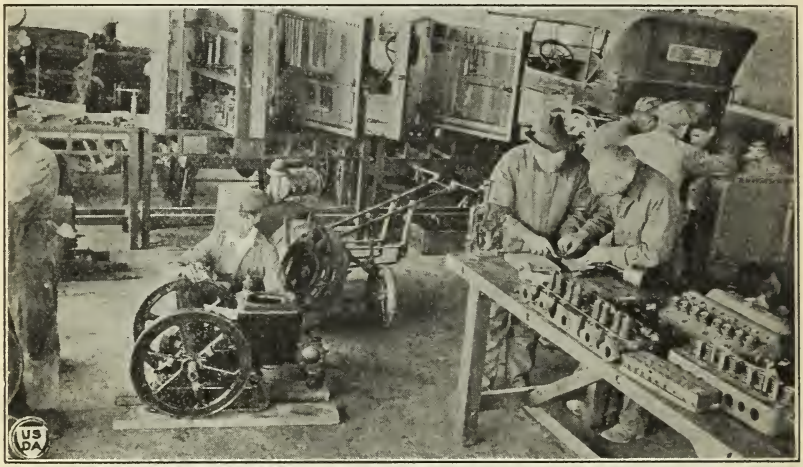

FIG. 10.—A gas-engine school.

It is not advisable to have boys in these schools who are under 18 years of age, unless they have a tractor at home and are expecting to operate or maintain one. The average age of the students of the tractor schools was between 35 and 40.

In North Carolina a survey was made of all the windmills in the State. Failures were found to be due to wheels not being high enough or to the tank being too small, and not on account of any general defect in the windmills.

The county agents' reports from 34 Northern and Western States show that 6,266 farmers were assisted in securing tractors, sprayers, ditching machines, or other machinery to economize labor.

LAND CLEARING.

As an extension project, land clearing includes the removal of stumps from cultivated fields, as well as the clearing of timberlands (fig. 11). There is probably more activity in actually bringing land into cultivation in the cut-over timberlands of Michigan, Wisconsin, and Minnesota than in any other section. In these States,

the land-clearing work was carried on largely by county land-clearing associations which were organized and assisted by the extension services of the several States.[1] This work has been extended during 1922. The activities of the extension rural engineer and the county agents in Michigan are summarized as follows:

Donations totaling $8,000 were secured from the boards of supervisors of 10 counties to carry on 38 land-clearing schools in these counties. One hundred and five winter land-clearing meetings were held in 12 counties with a total attendance of 10,045. Twenty-five newspapers were supplied with weekly material on land clearing. Essay contests on land-clearing subjects were conducted among school children, 1,000 essays being written, and prizes awarded. Two land-clearing trains were operated through the State, the fall train making 27 stops in 17 counties with 4,700 people in attendance. Three hundred and six thousand pounds of picric acid were distributed to farmers for land clearing. The goal set for land clearing in the upper peninsula was 60,000 acres (5 acres per farm) to be added to the area of cleared land annually.

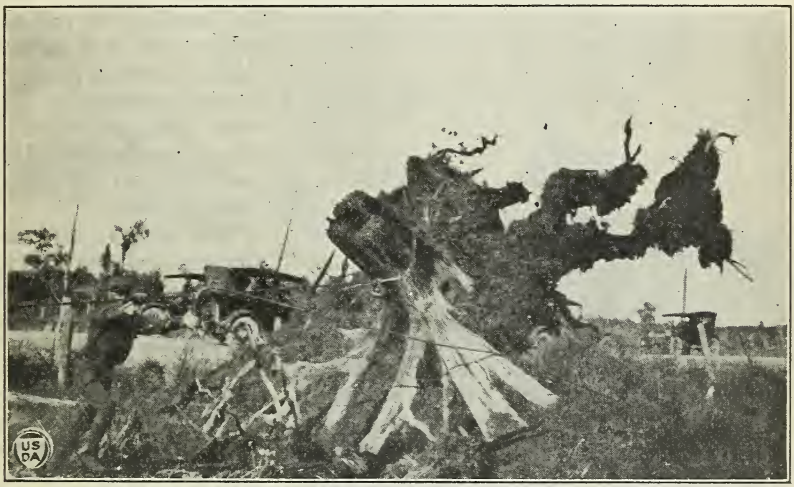

FIG. 11.—Pulling a stump with a stump puller.

In other sections of the country a great deal was accomplished in removing stumps from cultivated fields. The county agents' reports are not complete as to this item, but 14 Southern States report that 8,160 farmers were encouraged to remove the stumps from their cultivated fields and that 54,898 acres were so cleared (fig. 12).

The distribution of picric acid, which was carried on cooperatively by the United States Department of Agriculture and the extension services of many States, was a great aid in inducing the farmer to make an attempt to clear his land of stumps at a considerable saving to the farmer over the cost of commercial explosives.

OUTLOOK.

The outlook for rural engineering extension work for 1923 is very bright. The extension rural engineers are quite unanimously agreed that very much more construction work will be done this year than

[1] For a description of these land-clearing demonstrations see U. S. Dept. Agr. Circ. 244, Status and Results of County Agent Work, Northern and Western States, 1921, p. 28.

was done in 1922 because of the improved financial condition of the farmers. Then, too, the cumulative effect of many years of hard work has now become a strong and effective force so that each succeeding year should be better than the one before it, other things being equal.

Greater activity in construction means a greater need for assistance from the extension service and greater opportunity for service by it. This, in turn, calls for larger forces with increased expenditures of time and money, or the use of better and more effective ways of teaching, or both. In many of the reports one can detect a very serious questioning of the effectiveness of the present methods of instruction, and a desire to better these methods if possible.

FIG. 12.—Homemade gin pole for piling stumps preparatory to burning them.

It is clear that most of the agricultural engineering projects must be handled, as regards field work, in a manner different from most extension projects. The field demonstration is the most effective of the methods of teaching now in use.

The engineering demonstration, however, differs widely from those which are successful for soils, crops, or horticulture. In the first place, an engineering demonstration requires the expenditure of a considerable amount of money for a permanent improvement, and consequently its field is limited to those landowners who have the money available for the construction. Secondly, most of such demonstrations can not be followed by those present on their own farms on account of differences in topography, soil conditions, drainage features, requirements as to size and capacity of buildings, and similar things. Again, an engineering demonstration, so far as it deals with construction work, is interesting as showing proper methods, but it does not show the benefits to be derived from the improvement, and it may be a year or more before these benefits are manifest.

It seems that engineering demonstrations of construction, because of their permanent character, should be treated as permanent exhibits in order to bring out their full value. In order that this may be done most effectively, great care must be exercised in locating them so that

they may be readily accessible for inspection, so that the owner will carry out faithfully the instructions given him as to both construction and maintenance, and so that the benefits from the demonstration may be somewhat evenly distributed throughout the county or community. Where practicable, roadside signs calling attention to the previous conditions, giving cost data and other information, have proved of value in giving the demonstration permanence. Finally, some one, usually the county agent, should keep in touch with the demonstration at all times to see that the instructions given are being followed out and that production and cost records are properly kept and reported.

Because many of the engineering demonstrations can not be exactly followed on other farms, a successful demonstration causes a number of farmers to ask that they be given similar assistance on their own farms. The situation generally is as reported by one extension rural engineer, who says, "The demonstration was very successful, because 15 requests for assistance came in from the community." It is obvious that such assistance can not be given to all who ask for it, for there is a limit to the funds available for this work. It is equally obvious that it is impossible to give every farmer such instruction as will enable him to do all the engineering or architectural work which will arise on his farm. What then can be done? It appears that engineering projects may be divided into two classes, the strictly technical and the nontechnical or practical, although it may be that the dividing line between these two classes is sometimes indistinct. In the first class would come those subjects, such as drainage, irrigation, power development, and architecture, which can be adequately treated only by one who has had a technical education along one or more of those lines. The second class, the nontechnical subjects, includes terracing and soil-saving dams, the care and operation of farm machinery, and the use of shop tools, which may be taught in a comparatively short time to large groups of people.

With the first class of projects, it seems an absolute waste of time to attempt to instruct individuals or groups as to how to do these things, as these matters are to be learned only by years of study and experience. What should be taught is the benefit to be derived from the construction of these projects, the value of professional advice and the necessity of following this advice when it is obtained. It is realized that competent professional advice is not always available, but in such cases it is thought that more may be accomplished by working with those who already have the foundation of a technical education to the end that they may be able to apply that knowledge to particular conditions in the community. Such special training along engineering lines could be given by short courses, schools, correspondence, or by conferences to engineers, architects, surveyors, mechanics, or carpenters and should be somewhat of a postgraduate course to show them how to apply their technical knowledge to farm problems. It is doubtless true that a certain amount of personal service to farmers will always be necessary, but it is believed that this sort of service should be limited to a survey on broad lines to determine whether or not the project is feasible and profitable.

The second class of subjects may well be taught by short courses, schools, or by demonstrations to groups of people. In some subjects the attendants should be "hand-picked," so that they may become

leaders in these subjects in their own communities. No subject should be included in this class which can not be comparatively well mastered by the average man within a short time. Besides the projects previously mentioned, such subjects as land clearing, ditching with explosives, home water supplies, and many others, lend themselves to this method of instruction, and make up a very wide field. By this method the farmer may be taught how best to do the things which it is necessary for him to do, and since instruction can be given to groups the results will be widespread.

To sum up, the field of the extension rural engineer is to instruct the farmer concerning the benefits to be derived from the application of engineering knowledge to agriculture. This instruction should be practical and not technical. In order that the greatest number of people may obtain the benefits of such instruction, the service rendered individuals in highly technical subjects should be limited as far as is practicable to advice regarding the general plan and its feasibility, while practical subjects should be taught to groups of individuals who will, in turn, act as leaders in their communities.

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